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ABSTRACT

Information relating to course choice and commitment, and use of pre-enrollment information and advisory resources, were collected at the time of enrollment in 1980 from 1,375 first-year students at the University of New South Wales. The students were enrolled in the faculties of arts, architecture, and engineering. Multivariate analyses were used to determine whether any of this information could have been used to predict students' subsequent decisions to discontinue attendance. One year later only 916 students were still enrolled: about 12 percent had withdrawn within 2 months of their initial enrollment. The results show that the information did discriminate persisting and nonpersisting students. However, as the proportions of variance accounted for by the combinations of predictors were small, it is concluded that the information had value in terms of describing the types of conditions under which students were likely to be at risk, rather than as a means of identifying particular students likely to discontinue. A followup survey of 250 students revealed that almost half had not found the content of their courses to be as they had expected. Recommendations are made with respect to institutional provision for the pre-enrollment needs of students and future research. (Author/SW)

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Predicting Persistence and Withdrawal: an Analysis of Factors Relating to Students' Choice of Course

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Abstract

Information relating to course choice and commitment, and use of pre-enrolment information and advisory resources, was collected at enrolment from 1375 first year students at the University of New South Wales in 1980. Multivariate analyses were used to determine whether any of this information could have been used to predict students' subsequent decisions to discontinue. The results showed that the information did discriminate between persisting and non-persisting students. However, as the proportions of variance accounted for by the combinations of predictors were small, it was concluded that the information had value in terms of describing the types of conditions under which students were likely to be at risk, rather than as a means of identifying particular students likely to discontinue. A follow up survey of 250 students revealed that almost half had not found the content of their courses to be as they expected. Recommendations are made with respect to institutional provision for the pre-enrolment needs of students and that future research should focus on aspects of the institutional environment.

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1. Introduction

While the phenomenon of student withdrawal from university courses has been the subject of an immense body of research over the years, withdrawal rates have remained relatively stable. In fact it could be said that the major development in the light of all this work is that educational researchers have generally ceased to look for simple solutions. Recent approaches have moved instead towards recognising student withdrawal as a complex and developmental process, involving interactions between student characteristics and the academic and social environment of the institution (Tinto, 1975; Entwhistle & Wilson, 1977).

At the interface between student characteristics and the institutional environment lies the issue of pre-enrolment advice and information, and other aspects of the ways in which students select their courses. Without presuming that investigation of such factors might produce the panacea to the problem of student withdrawal, there exists some evidence to encourage exploration of the area.

Students entering tertiary education in Australia since the mid sixties have encountered a widening choice of courses and institutions in addition to having to contend with the pressures of selection based on a competitive quota system. Although Watkins (1976) and Lewandowski et al (1977) have examined the effects of such factors in retrospective studies of student withdrawal, there have been few attempts to incorporate them into predictive studies of student withdrawal (Muskat, 1979; Davies, 1978).

Certainty of career and personal aspirations, goal commitment, motivation and other aspects of the choice process have repeatedly been associated with student withdrawals (Baumgart & Johnston, 1977; Hayes, 1974; Lewandowski et al, 1972; Maddox, 1979; Rump & Greet, 1975). It has been found that when the effects of academic ability are controlled, motivation in terms of goal commitment, educational aspirations etc. appears to be the most influential factor in determining persistence at university (Eaton, 1979). In addition, studies of first year students suggest that at the point of enrolment many have had either inadequate time or information to make carefully considered decisions (Coyte, 1974; Davies, 1977,1978; Nelson-Jones & Toner, 1978; Watkins, 1976; University of Melbourne, 1979). Powell (1979) in a review of the problems of transition to university suggested that retention rates might be improved by providing more information and better advice to prospective students.

In 1979 the Committee of Inquiry into Education and Training advocated greater attention being placed on the responsibilities of educators for facilitating their students' transition to work or further education. The Committee proposed that steps be taken to improve the information, advice and time available to prospective students, in order to allow them to make more considered choices (Williams' Committee Report, 1979). It is these recommendations which constitute the impetus for this study.

It was decided to investigate the suggestion that poor motivation and subsequent discontinuation might be related to ill-advised enrolment decisions. Our hypotheses were that persistence would be positively related to students' motivation, confidence and commitment as expressed

at enrolment. In addition it was predicted that factors which might affect or merely reflect students' motivation and commitment would similarly be related to their persistence. Within the terms of the hypotheses students whose HSC results had been worse than they had expected, who were not enrolled in the course or at the institution of their first choice, who had made their enrolment decision under pressure of time and on the basis of little information, were expected to be more likely to withdraw from their course than were those whose enrolments proceeded under more favourable circumstances.

While other approaches have touched on this issue, most have been based on retrospective data which has certain deficiencies (Hayes, 1974; Lewandowski et al, 1972; Watkins, 1976). The difficulty of using retrospective data about feelings of commitment at enrolment is that one must assume that students' recall will not have been influenced by subsequent events. As studies of incoming students characteristically report high levels of optimism at enrolment (Katz & Barrett, 1972; Wieneke, 1976 ; 1979), it seems reasonable to suggest that several months later when students are asked to recall how they felt about their course at enrolment, their responses might reflect their experiences since enrolment. Accordingly, one could expect persisting students to be more certain of their enrolment decisions, whereas discontinued students might rationalise their decisions to withdraw by claiming that they had never been very committed to that course.

To overcome this inherent weakness in retrospective studies it was decided to attempt to determine, at the point of enrolment, the degree of confidence and commitment students felt towards their choice of course. This approach is subject to the objection that it is not reasonable to expect students on enrolment day to admit, on paper, to feelings of uncertainty with respect to their course commitment. By focusing on related questions such as the type and value of information resources used, the point at which final decisions had been made, and how confident and committed students felt once enrolment was accomplished, it was hoped that a realistic picture could be obtained without compromising students' confidence or enthusiasm for their new venture.

An enrolment survey was conducted at the University of New South Wales in 1980, which in this report will be referred to as the Intake Survey. The data obtained in that survey have been reported in an earlier paper (de Rome & Wieneke, 1981), and will be only briefly summarised here. The major finding of that survey was that a significant proportion of the students entering the faculties surveyed, were enrolled in courses which they had chosen under pressure of time and on the basis of limited information or advice. It was also apparent that a proportion of the students were not particularly committed to the courses in which they were enrolled.

The study reported here is an analysis of the data obtained in the Intake Survey in the light of whether those students subsequently persisted or withdrew from their course.

2. Procedure and Design

This report is based on the analysis of a survey of undergraduate students (the Intake Survey) when they enrolled in first year courses in the Faculties of Arts, Architecture and Engineering at the University of New South Wales in 1980.

The data sources used were:

a. a questionnaire (the Intake Survey) completed by these students (n=1375) as part of their enrolment procedure (de Rome & Wieneke, 1981);

b. institutional records referring to students' enrolment and academic status one year later;

c. a second questionnaire (the Follow Up Survey, n=250) mailed to all formally discontinued students and to a sample of continuing students.

2.1 The Survey Group

1. The Intake Survey. Completed questionnaires were obtained from 1,375 students at the enrolment centre in February 1980. While efforts were made to ensure that all students coming through that Centre were included in the survey, students who enrolled by proxy or who enrolled later in March, after the enrolment centre had closed, could not be included. It is one of the difficulties of surveys at that time of the academic year that enrolment figures fluctuate as students vary their enrolment in order to accept late offers for other courses, institutions or jobs. Enrolments are not finalised until 30 April at this institution, and it is normally on the basis of the figures at that date that university statistics are calculated.

By 30 April 1980, 168 of the students who had completed the questionnaire had already discontinued their enrolment. At that time, institutional records showed the first year population for the three Faculties to be 1528, but we had completed questionnaires for only 1207 of these students, representing 79%. The loss of 21% of the target population may constitute a potential source of bias, but unfortunately we had no access to these students enrolment details.

2. Institutional Records. Information obtained through institutional records allowed the classification of students according to their academic and enrolment status one year later. For the purposes of this study persisting students were defined as those who re-enrolled in their course in 1981. Students who discontinued during the academic year were classified as having discontinued, either with failure (DWF) or without (DWOF). The criteria which determine this relate to enrolment procedures which allow students a set period after enrolment during which time they may discontinue any course without incurring academic penalties. In general, this time extends for the first two months of any half year subject and for five months in the case of full year subjects. Academic failure is incurred by any student who discontinues after the date set by these periods.

3. The Follow Up Survey. This Survey was conducted in an attempt to discover whether the oft reported differences in commitment and certainty about goals, between persisting and non-persisting students, could be related to pre-enrolment factors or whether such decisions reflected withdrawing students' need to rationalise their decisions. Students were asked about their perceptions of their enrolment and course experience, so that this information could be compared to their responses on the initial survey. Despite a second round of questionnaires being sent out, the response rates to this survey were rather low (Discontinued, n=459, r=129(36%) ; Persisting, n=300, r=121(40%)). The sample of Persisters had been designed to be proportionately representative of the students surveyed in their faculties at enrolment according to whether or not they were in their first choice of course and institution. The sample obtained was over-representative of persisting Architecture and Engineering students, but discontinued students were proportionately representative of students in the three faculties.

2.2 Treatment of the Data

The analysis of the Intake data was designed to determine whether any of the information obtained at enrolment could have been used to predict students' likelihood of withdrawing. The data from institutional records were used to define four variables which classified students according to their enrolment and academic status one year after their initial enrolment.

The dependent variables were:

Persistence - distinguishes between students who re-enrolled in 1981 and those who did not.

Time of withdrawal - refers to the month when students officially notified the University of their withdrawal.

Success/Failure - distinguishes between students who left with, and those who left without, failure noted in their academic records.

Changed Course - identifies those students who had changed their enrolment from one Course to another within the institution, after they had completed the questionnaire at their initial enrolment.

Forty one predictor variables were derived from the Intake Survey data (de Rome & Wieneke,1981). They related to a range of factors including students' personal details such as age and sex, enrolment details such as faculty and whether they were enrolled full or part time, and finally factors relating to whether they had enrolled in their first preference course and institution, how and when they had decided on their choice of course and how confident and committed they felt towards their enrolment. A full list and description of the predictor variables is presented in Appendix A.

Because of the complex nature of the data and taking into account the possiblity that different combinations of predictors may differentiate between the various sub-groups of students it was decided to adopt a completely unrestricted (post hoc) approach to the analysis. Although

this meant adopting a higher critical value for tests of significance than that necessary for a planned procedure, it had the advantage of allowing exploration of questions suggested by the data, without appreciable loss of power. Following Harris (1975), $\emptyset$ (theta) was selected as the appropriate statistic for all stages of the analysis. For 1375 subjects, 4 dependent variables, 41 predictor variables, the critical value $\emptyset_c$=.053, where α =.05 (Tables of the greatest characteristic root, in Harris, 1975).

Our first step was to conduct an overall test, a canonical correlation, to establish whether there were any significant relationships between the set of dependent variables and the predictor variables. Coefficients from the canonical correlation were used to identify simplified combinations of the dependent variables. Multiple regression analyses were conducted for these combinations and for each of the dependent variables. In addition to describing the combined effects of the predictors on the dependent variables, this procedure permitted statements about the contribution of each predictor while eliminating the effects of all other predictors.

3. Results

The results will be presented in two sections. Section A presents the results of the statistical analysis of the Intake Survey data in terms of the measures of student enrolment and academic status. Section B examines individual questions concerning course choice and commitment, and other factors involved in students' initial enrolment decisions in relation to whether these discriminate between persisting and non-persisting students in the three faculties.

The data from the Follow Up Survey were not included in the statistical analysis but were used to supplement and extend the results of that analysis in descriptive terms.

3.1.1 Section A: Results of the Statistical Analysis of Student Data

The results of the canonical correlation suggests that the greatest predictive value of the data is in distinguishing between those students who left early in the year in comparison to those who persisted. Accordingly, a fifth dependent variable (Withdrew 30 April) was included to distinguish between students who left before 30 April (the date for the completion of enrolment) and those who persisted into the following year 1981. *

Each of the regression analyses produced linear combinations of the predictor variables which were significantly related to the associated dependent variables (see Table 1). However no significant relationships were identified between any of the dependent variables and any single predictor variable, even though each was examined with the effects of all other predictor variables controlled. (In this instance usefulness coefficients for the predictors were compared to $\emptyset_c$. See Harris, 1975). Similarly, none of the squared simple correlations

* Further information about the analysis may be obtained from the authors.

between the predictors and the dependent variables were significant when compared to $\emptyset_c$.

Table 1. Results of the Multiple Regression Analyses

Dependent Variable	R^2
Withdrew 30/4	.162*
Persistence	.144*
Changed Course	.080*
Time of Withdrawal	.078*
Success/Failure	.053*

*significant at α=.05, where $R^2 > \emptyset_c$=053

Essentially these results indicate that while none of the information obtained in the questionnaire could be individually predictive of students' persistence or failure, there were combinations of this information which accounted for statistically significant proportions of the variance. In each case the value for R^2 indicates the extent to which combinations of the predictor variables account for variance in that dependent variable. Thus the best linear combination of the information from the questionnaire was able to account for 16% of the variance for Withdrew 30/4 which discriminated between persisters and those who left before the 30th of April, whereas for Success/Failure which discriminated between those who left with failure and those who left without failure, the best combination of predictors could account for only 5% of the variance.

3.1.2 Discussion

To account for, at best, only 16% of variance clearly suggests that it is not possible to use the factors included in this study to identify those students unlikely to persist with their studies. However the distribution of weights in the regression analyses do allow for the selection of subsets of factors which, within the context of the study, describe the types of students most likely to behave in particular ways (See Appendix B). The descriptions which follow are based on the beta weights presented in Appendix B.

Persisting students were most likely to have been recent matriculants, who had high HSC aggregates and were enrolled full-time in either the Faculty of Architecture or Engineering. The University of New South Wales was their first preference institution, they consulted the available relevant publications concerning tertiary courses when making their enrolment decisions and they had a relatively longstanding commitment to the course that had been their first choice, although this does not necessarily imply that they were enrolled in that course. These students were unlikely to have indicated that the offer of a job could be an influencing factor in the event of discontinuing their course.

The most distinguishing feature of students who left before 30 April was that they were less likely to be enrolled in the institution that had been their first choice. They were also more likely than persisting students to be part-time or Arts students but less likely to be recent matriculants. In addition, these students tended not to have consulted the available publications on tertiary courses when making

their enrolment decisions, were not particulary committed to their course and indicated that in the event they were to discontinue, the offer of a job could be a likely influence. This is consistent with the fact that they were also more likely not to have made their course choice decision until they were forced by circumstances to do so. either when applying to UCAC or after the HSC results.

Students who discontinued with failure, in comparison with those who left without, were more likely to be enrolled in the Engineering Faculty, to have studied at an independent school and to have had a relatively low HSC aggregate. These students tended not to have consulted careers advisory resources through their school and they referred to such publications as the Directory of Tertiary Courses, Opportunities for School Leavers, CES Job Guide as being useful, although these publications are not in the main stream of relevant publications for prospective tertiary students. These students were also more likely to have matriculated earlier than 1978.

Students who changed their Courses after they had enrolled were likely to be at the institution of their first preference, but not in the Course of their first choice, although their HSC aggregates were not low. These students, at intake, reported that they had seriously considered their original Course of enrolment as an alternative to their first preference Course before they had learned of their HSC results, but they had experienced considerable difficulty in making the decision to enrol in that Course. Having finally enrolled, these students did not express much commitment or enthusiasm for their Course and were less confident than other students that they had made the right decision. It is worthy of note that of the 42 students included in this category, all but two of those who changed Courses persisted into 1981.

3.2 Descriptive Analysis of Student Data

Despite the low predictive value of the data, the following section of the results is included in order to demonstrate particular points of interest in the study and to compare information obtained at intake with that obtained from the same students after some months at university. It is important to note that the relationships apparent in the proportions reported in the following pages do not take into account the contribution of the other variables in the study.

As mentioned earlier, 168 of the students (12%) who had been surveyed at enrolment withdrew before that date. Such students are not considered to have been fully enrolled and are not normally included in university statistics for the calculation of persistence rates. A brief description of this group is included here as little information is generally available about the features of such students. The remaining portion of the paper will be concerned only with those 1207 students who were still enrolled after 30 April, 1980.

3.2.1 Students who withdrew before 30 April 1980 (n=168)

A proportionately greater number of Arts students withdrew before 30 April than did students from the Faculties of Architecture or Engineering.

Table 2. Students who left before 30 April by faculty

Faculty	Total surveyed	Total withdrew	Percentage withdrew
Arts	738	108	15%
Architecture	206	19	9%
Engineering	431	41	9%
Total	1375	168	12%

Some students withdrew from their enrolment before classes had begun for the academic year, while others maintained their enrolment for a short time after classes commenced before deciding to leave. In order to provide a more meaningful profile of students who left before 30 April, we have preserved this distinction in the following descriptions.

Students who withdrew before classes commenced (n=102)

The majority of these students had not enrolled in the course and/or at the institution that had been their first preference (81%). This had occurred most commonly among students whose HSC aggregates were below 300; however almost 30% of this category had aggregates above 300 and only 28% of these higher aggregate students had enrolled in their first preference course and institution. As one could expect, many of these students withdrew in order to accept offers from other institutions (n=60).

In general this group were mostly young students who had enrolled at university immediately after having left school. Their choices and enrolment decisions had been dependent on their HSC results and on the offers which they received on the basis of those results. Many of these withdrawing students (60%) said that their HSC results had been worse than they had expected, which may explain why such a high proportion had, at least initially, not been able to enrol in their first preference course. This may also explain how it could be that such a high proportion (54%) of those not enrolled in their first preference course admitted that they had not seriously considered the course of enrolment as an alternative until after they had received their HSC results.

These students were less likely than persisting students to have consulted Faculty Handbooks when making their enrolment decisions, which is interesting when one considers that this group were also more likely to include those few students in the overall survey who admitted to being "not very confident" that they had made the best enrolment decision. Only 43% of these students expressed positive feelings of commitment or enthusiasm for their course, compared with 65% of the entire survey. In fact, 50% said that in the event that they were not to continue with their enrolment, the offer of a job could be a likely

factor in their decision to withdraw; this is in comparison to only 27% of the persisting students. In all it is not very surprising from their responses that these students did not persevere with their enrolments at this institution.

Students who withdrew after classes had commenced (n=66)

Students who withdrew after session had commenced were very similar to those who had left earlier, the differences generally being more a matter of degree than direction. Relative to those who left earlier, this group did have somewhat higher HSC aggregates, tended to be more likely to be enrolled in their first choice course and institution and to have expressed positive feelings of commitment towards their enrolment. However, older (26%) and part-time (15%) students were over-represented in this group relative to their proportions in the overall survey, (12% and 5% respectively). Presumably, although as a group these students had more reason than the earlier leavers to be content with their enrolment, other factors intervened during those first two months which led to their decision to withdraw.

3.2.2 Students who continued their enrolment after 30 April

Enrolment Characteristics

Students from the professional Faculties, Architecture and Engineering, were more likely (84%) to persist with their courses than were the Arts students (69%).

Table 3. Persisting and Non-persisting students

	Arts	Architecture	Engineering	Total
Persisters	433	157	326	916
Non-persisters	197 (31%)	30 (16%)	64 (16%)	291 (24%)
Total	630	187	390	1207

In each faculty the characteristics of the persisting students were generally representative of all the students in that faculty who had responded to the survey.

A major feature of interest among the enrolment characteristics was HSC aggregate, particularly in reference to its function as a selection device. The simple correlations between persistence and HSC aggregate in each of the three Faculties were very low (Arts r=.113, Architecture r=.01, Engineering r = .198). As we were also interested in the pattern of wastage in each of these faculties, it was decided to single out for inspection those students whose HSC aggregates placed them within 20% of the cutoff for their course quota. Although these figures were computed for each individual course, the results have been combined into faculties for ease of comparison. Table 4 shows the proportions of persisters and non-persisters who would have been

excluded if course quotas had been reduced by 20% in 1980. For example this would have meant the entry cutoff for any course in the Arts Faculty would have been 260 instead of 250, whereas the cutoff for the Electrical Engineering course in the Engineering Faculty would have been 343 instead of 320.

Table 4. Proportions of Persisting and Non-persisting students from each Faculty who were in the lower 20% of HSC scorers for their Course

	Arts	Architecture	Engineering	Overall
Persisters	19%	20%	14%	18%
Non-persisters	27%	20%	44%	30%

It is apparent from this Table that persisting and non-persisting Architecture students were equally likely to have come from the upper or lower HSC group. However, non-persisting Engineering and Arts students were disproportionately represented in the lower 20% of HSC scorers in their course. The effect of HSC was strongest for the Engineering students with persisting students being least likely to have been in the lower 20% group.

A closer look at these non-persisting students with regard to their HSC aggregates shows that those in the lower 20% for their course in both Architecture or Engineering were more likely (60%), to have discontinued with failure (DWF), whereas those in the upper 80% were less likely, (25% and 21%, respectively). This pattern was not observed in the Arts Faculty where 35% of non-persisters from the lower 20% and 42% of non-persisters from the upper 80% discontinued with failure.

Of the students who left without failure (DWOF), Engineering students were more likely to have left during the year (62%), whereas Architecture students tended to complete their year's study but not re-enrol in 1981 ie. successful dropouts (55%). Arts students who left without failure appeared equally likely to either discontinue (53%) during the year or to be successful dropouts (47%).

Table 5. Non-persisting Students' enrolment status by Faculty

		Arts n	Arch. n	Engin. n	Total n
DWOF	(a) during the year	64	9	23	96
	(b) Successful dropouts	55	11	14	80
DWF	(a) during the year	17	3	2	22
	(b) absent failure	28	2	12	42
	(c) failed at the end of the year	33	5	13	51
Total		197	30	64	291

With regard to HSC aggregates, the pattern of differences between discontinued Architecture and Engineering students was most apparent

amongst those who left during the academic year without failure. Only 14% of DWOF Architecture students compared to 35% of DWOF Engineering students came from the lower 20% of HSC scorers in their respective faculties.

DWOF students who left during the year were generally more likely than persisters to have sat the HSC prior to 1979. In the Architecture and Engineering Faculties such students were also more likely to be female and part-time than were persisting students. An interesting finding was that these students were more likely to have reported their HSC results to have been 'as expected' rather than 'worse' or 'better than expected'. This may suggest that these students were also likely to have had a realistic idea of how they would perform at university and took steps to discontinue without failure if they found that they were not coping adequately. Arts students who discontinued without failure were by comparison marginally more likely than persisters to have performed worse than they had expected in the HSC.

Successful dropouts (n=80) were those DWOF students who completed the academic year. The profile of these students in terms of their entry characteristics differs somewhat from all the other categories of students. Successful dropouts in all faculties were more likely to be male and in the Arts Faculty they were more likely to be recent school leavers. The follow-up data for these students suggests that a number of them left because they had been able to transfer to courses at other institutions. Apparently the fact that a greater proportion of these students (23%) fell within the lower 20% of HSC scorers for their courses than did persisters (18%), did not inhibit their transfer to other courses or result in discontinuation with failure. Among Architecture and Engineering students, successful dropouts were more likely to have matriculated earlier than 1979, to be in the top 80% of the HSC scorers in their course and to have performed better than expected in the HSC. They were also more likely to be part-time students and this is consistent with evidence from the Follow-Up Survey where some students from these faculties indicated that job commitments or the terms of cadetships had not permitted them to continue with their studies in 1981.

DWF students (n=115) were very similar to DWOF students in most respects. In Architecture and Engineering they were more likely to be males, whereas the DWOF students were more likely to be females. In the Arts Faculty DWF students were similar to persisters in terms of the proportions in the lower 20% of the HSC range (21%), but they were less likely than persisters to have viewed their HSC performance as 'better than expected'.

It should be noted that DWF students included only 51 students who actually failed in terms of attempting but not satisfactorily completing their academic course requirements. Twenty two had notified the University of their decision to withdraw during the year but had done so after the critical dates and had thus incurred academic penalties. The remaining 42 students had been classified as 'absent failures' after their final examinations. It is difficult to compare students who 'absent fail' their courses with any other types of student as 'absent fail' simply means that the students discontinued their studies at some point without notifying the University, so that their absence was not noted until they failed to complete their final assessment.

Choice of Course and Institution

Students were asked questions at enrolment about how they had decided on their first choice course and, if they had not received an offer for that course, when they had first considered their current enrolment as an alternative. It was anticipated that some differences might have been evident between persisting and non-persisting students. While some differences have emerged between persisting and non-persisting students from the different faculties, these differences do not form a consistent pattern and are not sufficiently great to serve as useful predicters of persistence or discontinuation. It is notable, for instance, that among successful dropouts in the Arts Faculty, proportionately more had decided on their first choice while still at school, whereas among Architecture/Engineering students a considerably greater proportion decided on their first choice when completing the UCAC form.

Among students who did not enter their first choice course, Arts students were more likely to have considered alternative courses relatively late either at or after completing the UCAC form, while Architecture/Engineering students considered alternatives before they were required to complete their UCAC forms.

In all Faculties, the analysis of the enrolment data suggested that persistence and withdrawal rates were little affected by whether students obtained their first choice of course and institution, although institution of first choice seemed to be a rather more important factor for Architecture and Engineering students. From the Intake data it would seem that selection to the course or institution of first choice ceases to be a major factor once students have decided to confirm their enrolment at the end of April. However the findings of the Follow Up survey would suggest a somewhat different picture of the persisters and non-persisters.

In the Intake Survey it had appeared that approximately equal proportions of persisters and non-persisters had access to the course of their first choice. However from the results of the Follow Up survey, it would seem that some 33% of the students who were ostensibly enrolled in their first choice would have preferred another course. This casts some doubt on the validity of our factor of course choice. In the Intake Survey students were asked whether they were enrolled in their first choice course; however it was not made clear as to whether this meant their original first choice or an amended choice made after they received their HSC results. In retrospect it would seem that this was possibly an oversight in our data collection.

In this respect it is worth noting that in 1980, when this survey was conducted, 43% of HSC candidates changed their preferences with UCAC after they had received their HSC results (U.C.A.C. Report, 1980). Overall 34% of persisters and 74% of non-persisters said in response to the Follow Up Survey that they would have preferred another course if HSC had not been a restriction. When asked why they had enrolled in that particular course, persisters were more likely to say they were specifically interested in either that course (45%) or in the training provided (24%), whereas non-persisters were equally divided between these reasons and the reason of that course simply being the best offer received (20% gave each).

Information and Advisory Resources Consulted Prior to Enrolment

Students were asked at enrolment whether they had consulted a selection of publications specifically designed to assist them in making choices of course and institution. They were also asked which people (e.g. Career Advisors, university staff etc.) they had consulted. It was expected that students who had taken time and trouble to consult as widely as possible before making their choice of course would be more committed to that course and therefore more likely to persist with their chosen course.

Analysis of responses to the Intake Survey indicated that whether or not students had consulted people such as Career Advisors was not a significant discriminator between students who persisted and those who discontinued. Of the publications, only three seemed to bear a relationship to persistence. These were Faculty Handbooks, Higher Education Handbook and the UCAC Student's Information Guide; however the results of the analysis suggested that the significance of these publications was in terms of whether or not students had consulted them, and was not related to students' ratings of usefulness.

Arts students consulted Faculty Handbooks with much greater frequency than did the Architecture or Engineering students. This is undoubtedly related to the greater diversity of subjects available to Arts students and the need for them to be aware of the range of subjects and their content. Architecture and Engineering courses have a more restricted number of first year subjects, most of which students are required to study. Consultation of the Higher Education Handbook and the UCAC Student's Information Guide occurred with similar frequency for each group.

In the Follow Up Survey it was disturbing to find that overall 48% said that the content of their courses was not as they had expected. This occurred more frequently among the non-persisting students (55%) but is was also true of a high proportion of persisting students (44%). Both groups gave a wide range of reasons to explain how the content had not been in accord with their expectations; however persisters were more likely to refer to a difference in emphasis (25%) or work load (20%) whereas non-persisters found the course less interesting (15%) or the teaching poorer (15%) than they had expected. A proportion (11%) of non-persisters also said that they had found themselves to be lacking in necessary skills.

As responses on the Follow Up Survey could be directly related to student's responses on the Intake Survey, we were able to establish just which advisory and information resources particular students had consulted when making their course decision. Overall students who had consulted the various resources were almost evenly divided on whether their course content had been as expected. However there were two resources which were exceptions. These were university students and career information programmes in the media (i.e T.V., newspaper articles etc). That is to say that the majority (62% in each case) of students who reported having consulted either of these two resources also subsequently reported in the Follow Up that the content of their courses had been as they had expected. This was also true, though to a lesser extent, of students who had consulted people who were working in the field of interest.

A comparison of the proportions of students whose courses were in accord with their expectations actually shows a general trend against those who consulted. That is, for the majority of resources listed, students who had not consulted a particular resource were marginally more likely to have reported their course content to have been as expected.

When we combine this information with data on student persistence we find that persisting students appear to have benefited from having consulted particular resources far more than did non-persisting students. Although the Intake Survey showed that persisters and non-persisters were generally equally likely to have consulted the various resources, a greater proportion of non-persisters who had consulted subsequently said their course content was not as expected. This might be interpreted to mean that these students had a more negative view due to their experiences since enrolment. However, if such differences were to be solely ascribed to the fact that these students had discontinued, one would expect a similar difference between persisting and non-persisting students who had not consulted those resources - which does not appear to be the case (See Tables 6 & 7).

Table 6. Proportion of Persisting and Non-persisting students who said their course content was as expected according to whether they had consulted each Advisory resource

	Persisters		Non-Persisters	
Total no. who consulted	Consult.	Not Consult.	Consult.	Not Consult.
	%	%	%	%
School Careers advisors (n=120)	55	58	36	55
Parents & other relatives (n=168)	54	71	44	50
School teacher (n=110)	55	58	42	49
Own friends (n=139)	54	62	41	53
People working in the field (n=126)	60	49	44	48
Academics (n=67)	60	55	34	52
Vocational Guidance (n=81)	60	53	31	52
Careers Reference Centre (n=63)	60	55	42	47
University Counsellors (n=51)	65	55	36	51
University students (n=113)	66	43	56	34

Table 7. Proportions of Persisters and Non-persisters who said their course content was as expected according to whether they had consulted particular information sources

	Persisters		Non-persisters	
Total no. who consulted	Consult.	Not Consult.	Consult.	Not Consult.
	%	%	%	%
Faculty Handbooks (n=151)	54	63	47	41
Alternative Students' H'Book (n=64)	53	58	37	50
Background to Careers (n=126)	55	60	41	51
Higher Ed. H'book (n=66)	55	57	41	47
Job Prospects (n=51)	69	52	32	49
UCAC Student's Info. Guide (n=115)	59	54	36	58
Media(TV,newspaper articles, n=87)	68	46	52	42
Career films (n=59)	57	56	35	48
Vocational Guid. pamphlets (n=83)	58	55	35	50

Factors related to Commitment

None of the questions in the enrolment survey directly related to students' commitment to their course choice were useful in distinguishing between persisters and non-persisters. Two factors which did seem to have some bearing as discriminators, however, were whether students saw a job offer as a likely possible alternative to their course and whether at enrolment they could conceive of the possibility of subsequently changing their career direction.

The Intake Survey responses of Arts students who became successful dropouts seemed to suggest that they had been less happy with their course choice than other persisting and non-persisting students and it appeared that they were using their first year at university to sort out their ideas on what they wanted to do in the future. They were not significantly more likely than other students to say they would consider taking up a job offer, but were evidently thinking seriously about changing their career choice.

Among Architecture and Engineering student there was a trend among all non-persisting students to consider taking up a job offer, while those who discontinued with failure were least likely to consider a change in career choice. As in all the data presented, however, the number of students in each of the non-persisting categories was small and trends which have been discerned should be treated with caution.

4. Discussion

The results of the survey have confirmed the suggestion that time of choice, information and commitment are factors influencing pre-enrolment decisions which may subsequently be related to student withdrawal. While no single factors were significantly predictive of withdrawal, statistically significant combinations of factors were identified. As the proportions of variance accounted for by such combinations were statistically significant but invariably small, it was concluded that such information is useful for identifying the types of conditions under which students are more likely to be at risk, rather than identifying students likely to discontinue. In this way the study also serves to confirm the findings of other studies which have concluded that it is not possible to identify those students who are unlikely to complete their courses (See the review by Eaton, 1979). The significance of this study lies in its confirmation of these conclusions despite an attempt to incorporate those factors commonly identified as important by retrospective studies of discontinuing students. This is not to deny that students who discontinue may often refer to lack of commitment and uncertainty of academic goals in explaining their withdrawal but it confirms that such factors are not a sufficiently distinguishing feature of these students at the point of enrolment to justify attempts at prediction.

Questions relating to course choice and commitment held most value in discriminating those students who left very early in the year, which suggests that even at enrolment these students were conscious of, and willing to articulate, feelings of doubt about their decision. From this it would seem that those first two months, during which students may discontinue without penalty, are valuable in enabling them to decide, on the basis of experience, whether they wish to continue with their enrolment. Students who discontinued later in the year were less easily distinguished from persisters although they were very similar to those students who left earlier, the differences on factors generally being more a matter of degree than of direction.

Apart from particular features of their enrolment which have been commonly associated with non-persistence (e.g. part-time, low HSC aggregate), in this study the factors of interest which emerged as contributing to the difference between persisting and non-persisting students included time (how long before enrolment had they decided on their first choice course), information (whether they had consulted particular information guides for prospective students) and commitment (whether they admitted at enrolment that the offer of a job could be a likely influence if they were to discontinue their course). These findings do lend support to the suggestion that lack of time and information when making decisions and lack of commitment at enrolment were associated with student withdrawal. The fact that the information was most effective in distinguishing those students who left early from persisters, and least effective in distinguishing between those who left with or without failure, offers confirmation that the relevant aspects of choice and commitment were not confounded by attributes of academic ability.

The question still remains as to why one in four of the students included in this survey discontinued within one year of their enrolment. It is clear that attrition is not simply a question of

students' academic failure. The majority of students from this survey who discontinued did so without failure. For some this may have been a decision prompted by the awareness that failure was likely, but for others it may equally have been prompted by a realisation that university was not fulfilling their goals.

It was a particular point of interest in this study to try to discover whether the oft-reported differences in commitment and certainty about goals between persisting and non-persisting students could be related to less adequate pre-enrolment decision strategies on the part of those students who subsequently withdraw; or whether such students, having withdrawn, have an altered perspective when recalling their feeling at enrolment, which is the result of their experiences at university and the need to rationalise their decision to withdraw. Our interest was in whether there was anything about their pre-enrolment decision strategies which distinguished them from their peers who persisted, and whether intervention at that stage could conceivably have altered the pattern of subsequent events. Unfortunately the follow up survey does little to resolve the issue as to whether the students' goals have changed or the university was not in accord with their expectations, although it does serve to confirm the suggestion that many students do not know what to expect when they enrol in university courses.

While the Intake Survey showed that no single factor, including HSC aggregate, could be identified as distinguishing between the two groups, there was evidence that certain factors when they occurred in combination did contribute in a reliable way to the prediction of non-persistence. From those results one could say that non-persisters were more likely to have enrolled under less than propitious conditions, suggesting that they had either put less effort into or had reduced opportunities to thoroughly investigate their course prior to enrolment. While taking into account the likelihood that non-persisters responding to the follow up questionnaire would be obviously more likely to be critical of their course and to rationalise their decision to withdraw, there would seem to be some evidence to suggest that these students were somewhat more likely to have entertained some misconceptions about their course or university life. As it is apparent that in general these students were just as likely as persisters to consult most of the advisory and information resources available, it seems curious that they did not benefit equally. One can only speculate, but perhaps the explanation is that these students were less well equipped to maximise the benefit of consulting these resources because they were not very sure of what they wanted and were therefore less able to ask the appropriate questions and access the most relevant information.

5.Conclusions

The results of this investigation serve to confirm the findings of other studies which have concluded that the identification of factors associated with discontinuance does not produce information likely to be useful in predictive terms. At the interface between student characteristics and the university environment, we have identified combinations of factors influencing or relating to students' enrolment decisions which are useful in identifying types of students likely to be at risk of discontinuing. In recognition of such factors it is recommended that students be encouraged to take more time in considering their course and career goals, and that institutional provisions take account of these needs. In particular, it is suggested that Faculty Handbooks be reviewed and revised where necessary to give prospective students, in simple language, as accurate a picture as possible of the content of their courses . In addition, it is suggested that staff responsible for first year courses pay particular attention in those first few weeks to finding out what it is the students expect of their course and rectifying any misconceptions. In particular, this might require discussing and describing the rationale of each subject and where it fits into the overall course, the specific content of each subject and what will will be expected of them as first year students.

In conclusion it would seem that future research efforts into student wastage would be usefully focussed on aspects of the institutional environment into which students are received and ways in which provisions might be made to assist students likely to be at risk.

6. Summary

The aim of this study was to investigate the relationship between factors relating to how and when students decided to enrol in particular courses and whether they continued into the second year of their enrolment. Some of these factors included whether students were enrolled in their first preference course; when they had made that decision; what information and advisory resources they had consulted; and how confident and committed they felt towards their enrolment. Information was collected by questionnaire from 1,375 first year students who had enrolled in the Faculties of Arts, Architecture and Engineering at the University of New South Wales in 1980. Follow up information was also obtained from some of these students later in the year.

One year later only 916 of the students were still enrolled at University. Approximately 12% had withdrawn within two months of their initial enrolment. A further 21% had discontinued at some time later; however, of these students, less than half had discontinued with failure.

Multivariate analyses were used to determine whether any of the information obtained at enrolment could have been used to predict students' decisions to subsequently discontinue. The survey information did discriminate between persisting and nonpersisting students. Relatively speaking it was most effective in discriminating between those who persisted into the second year of their course and those who left early in first year, and least effective in discriminating between those who left with failure and those who left without. However, as the proportions of variance accounted for by the combinations of predictors were small (all were less than 16%), it was concluded that the information had value in terms of describing the types of conditions under which students were likely to be at risk, rather than as a means of actually identifying students likely to discontinue.

The results showed that the students most likely to persist with their studies were, as one might expect, those with high HSC aggregates who were enrolled in vocational courses and were studying full time at the institution of their first preference. However it was also apparent that these were also likely to be students who had consulted the available publications concerning tertiary courses and who had been thinking and had made some decisions about their course choices over a period of time rather than only when they were required to submit enrolment applications. Students who left early were far less likely to be in either the institution or the course of their first preference and were more likely to have made their course choice decision late, both of which factors would presumably be related to the fact that they also tended to have relatively low HSC aggregates. Unlike persisting students these students also most frequently agreed at enrolment that in the event they were to decide to discontinue their course, the offer of a job could be a likely influence.

The Follow-Up Survey revealed that almost half of the students, persisters and non-persisters, had found the content of their courses not to have been as they had expected. When compared to their Intake Survey data on advisory and information resources, it appeared that in

general students who had consulted these resources were less likely to have subsequently reported their course content to have been 'as expected'. However although non-persisters were just as likely as persisters to have consulted the various available resources, they appeared to have benefited less, in terms of having appropriate expectations of their courses.

It is recommended that prospective students be encouraged to take more time in considering their course and career goals and that institutional provisions take account of these needs. In particular it is suggested that Faculty Handbooks be reviewed and revised where necessary to give students as accurate a picture as possible of the content of their courses. It is suggested that staff responsible for first year courses should pay particular attention in the first few weeks to making sure students understand the rationale of their subjects and what is expected of them in their first year. Finally it is recommended that future research into wastage would be most usefully focussed on aspects of the institutional environment rather than pursuing predictive studies based on intake characteristics.

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Appendix A

Predictor variables derived from the intake questionnaire survey (de Rome & Wieneke, 1981).

Q1sex	Male or female student
Q2age	Students' age
F4school	Attended a state school vs. attended a private school
F5school	Attended an independent school vs. a systemic school
Q5hscagg	HSC aggregate if applicable
F6expect	Had some expectations about HSC results vs. no expectations
F6congru	Continuum of congruence between HSC results and expectations (better than, as expected, worse than expected)
F7break	Student has taken a break between school and university vs. no break.
F8faculty	Arts Faculty vs. Arcitecture and Engineering combined
F9faculty	Architecture vs. Engineering
F10hours	Continuum of amount of time spent travelling to university
F11inst	UNSW first choice institution vs. not first choice institution
F12crs	Enrolled in first choice Course vs. not first choice Course
F13alter	Alternative Courses considered before UCAC closing date vs. considered when had to make a decision
F14alter	Alternatives considered before received HSC results vs. only after receiving HSC results
F14confid	Continuum of confidence in enrolment decision (very confident to not very confident)
F15chose	Continuum of when decided on first choice Course (Primary school through to after receiving HSC results)
C16schl	Did not consult vs. consulted advisors available through school (School careers advisor, Vocational Guidance, Careers Reference Centre)
U16schl	Found the above not useful vs. useful
C16priv	Did not consult vs. consulted personal contacts (parents or relatives, school teachers, own friends and university students)
U16priv	Found the above not useful vs. useful
C16publ	Did not consult vs. consulted strangers on own initiative (People working in the field, university academics, university counsellors)
U16publ	Found the above not to be useful vs. useful
C17schl	Did not consult vs. consulted publications most relevant to prospective tertiary students (Faculty Handbooks, The Alternative Student's Handbook, UCAC Students Information Guide, Higher Education Handbook)
U17schl	Found the above not to be useful vs. useful
C17ref	Did not consult vs. consulted peripheral references (Directory of Tertiary Courses, CES Job Guide, Job Prospects, Opportunities for School Leavers, Graduate Outlook)
U17ref	Found the above not to be useful vs. useful
C17genl	Did not consult vs. consulted publications related to careers in general (Background to Careers, career films and other information presented in the media, pamphlets from the Vocational Guidance Bureau)
U17genl	Found the above not to be useful vs. useful

F18info	No difficulty obtaining information about courses/careers vs. experienced some difficulty
F18decis	No difficulty making a decision vs. difficulty choosing between alternatives or knowing what to do.
F18time	Sufficient time to make decision vs. insufficient time
F18nodif	No difficulties encountered vs. some difficulties encountered
F19intrin	Course chosen for interest in subject - continuum of importance
F19extrin	Course chosen for extrinsic reasons - continuum of importance
F20comit	Continuum of feeling of commitment to the course
F21intrst	Likely to withdraw if course is not as expected or if career interests change vs not likely
F21dific	Likely to withdraw if find difficulty with the course vs. not likely
F21offer	Likely to withdraw if receive the offer of a job vs. not likely

Appendix B

The results of the multiple regression analysis for each dependent variable is presented below with a selection of those predictor variables, with the highest beta weights, included.

Dependent Variable

Withdrew 30th April Multiple R^2 = .162

Critical Value $\emptyset_{.05}$ = .053

Early leavers compared to those who persisted and re-enrolled one year later.

Predictor Variables	Beta Weights	Directional Interpretation
F11institution	-.173	Not enrolled at Ist choice institution
F21offer	.127	If decided to withdraw, a job offer could be a likely incentive
C17school	.083	Did not consult major course information publications
F20commitment	-.074	Not fully committed to course decision
F18decis	.069	No difficulty in making course decision.
F13time	-.058	Decided course preferences at crisis points (when applying to UCAC or after HSC results)
F12course	-.054	Not in Ist choice course
F8faculty	.150	Enrolled in the Faculty of Arts
Q9ftpt	-.167	Studying part time
F3matric	.090	Matriculated earlier than 1979/1980 if at all.
Q2age	.075	Older student
Q1sex	.072	Male student
F6expect	-.070	Didn't know what to expect from HSC results
F4school	.066	Went to a state high school

Persistence Multiple R^2 = .144

Critical value $\phi_{.05}$ = .053

Students who re-enrolled one year later compared with those who discontinued their enrolment.

Predictor Variables	Beta Weights	Directional Interpretation
F11inst	.115	Enrolled at the institution of Ist choice
F21offer	-.101	A job offer would be unlikely to be an influence in a decision to discontinue this course.
F15chose	.072	Decided Ist choice course early in school career
C17schl	-.071	Consulted the major course information publications
F20comit	.055	Pleased and content with enrolment commitment
F12crs	.051	Enrolled in the course of Ist choice
F18decis	-.051	Some difficulty in making final course decision
Q9ftpt	.139	Studying full time
Q5hscagg	-.128	High HSC aggregate
F8faculty	-.127	Enrolled in either Architecture or Engineering
F3matric	.100	Matriculated within last two years
F4school	.066	Studied at a state high school
Q2age	-.065	Older student
Q1sex	-.060	Female student

Changed Course Multiple R^2 = .080

Critical value $\phi_{.05}$ = .053

Students who changed their course within a few weeks of enrolment compared with those who did not change courses.

Predictor Variables	Beta Weights	Directional Interpretation
F11institution	.096	Enrolled at Ist choice institution
F12course	-.095	Not in Ist choice course
F14alter	.080	Considered alternative course before HSC results
F14confidence	.085	Not confident this is best enrolment decision
F18decis	.067	No difficulty in making course decision.
F20commitment	-.099	Not fully committed to course decision
C17general	-.053	Consulted
Q5hscaggregate	-.109	High HSC aggregate
F3matric	.100	Matriculated recently either 1979/1980
F6expect	-.055	Didn't know what to expect from HSC results
F5school	.059	Went to an independent school

Time of Withdrawal Multiple R^2 = .078
Critical value $\phi_{.05}$ = .053

Students who left later in the year in comparison with those who left early.

Predictor Variables	Beta Weights	Directional Interpretation
F11inst	-.051	Enrolled at the institution of Ist choice
F21offer	.082	A job offer would be unlikely to be an influence in a decision to discontinue this course.
U17ref	.055	Found c17ref not useful
F13alter	-.055	Considered alternative courses earlier
Q5hscagg	-.155	Low HSC aggregate
F8faculty	.079	Enrolled in Architecture or Engineering courses
F5school	.075	Attended a regional systemic school (state or catholic)
Q9ftpt	-.073	Studying part time

Success/Failure Multiple R^2 = .053
Critical value $\phi_{.05}$ = .053

Students who discontinued without failure compared with those who discontinued with failure.

Predictor Variables	Beta Weights	Directional Interpretation
U17reference	.058	Information sources very useful
C16school	-.055	Did not consult careers/course advisors through school
Q5hscaggregate	-.192	Low HSC aggregate
F8faculty	.088	Enrolled in either Architecture or Engineering
F3matric	.149	Matriculated earlier than 1979 if at all
F5school	-.077	Went to an independent school
F9Faculty	-.056	Enrolled in Engineering